

**ADJUSTABLE HIKING STICK HAVING MULTIPLE SECTIONS AND
SLIDE LIMIT DEVICES TO PREVENT THE SECTIONS FROM
PULLING ENTIRELY OUT OF ONE ANOTHER**

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an adjustable hiking stick, and more particularly to an adjustable hiking stick having multiple sections that cannot be completely pulled out of one another.

2. Description of Related Art

Adjustable hiking sticks are popular and comprise multiple sections that slide into one another so that the adjustable hiking sticks can be lengthened, shortened or completely collapsed for temporary storage. Each of the sections of a hiking stick is substantially a short tube that slides into another short tube to make the hiking stick telescopic.

With reference to Fig. 5, adjacent sections of an adjustable hiking stick in accordance with prior art are connected at a joint. The joint comprises a large outside section (60), a smaller inside section (50), a locking mechanism (61) and an end sleeve (51). The outside section (60) has an outside end (not numbered) and an interior surface (not numbered). The end sleeve (51) is attached to the outside end of the outside section (60).

The inside section (50) has an inside end (not numbered). The inside end extends into the outside section (60) through the end sleeve (51) and the outside end of the outside section (60). The locking mechanism (61) is mounted at the inside end of the inside section (50) and comprises a stationary end plug (611), a

1 threaded shaft (612) and a locking rotor (613). The stationary end plug (611) is
2 fastened at the inside end of the inside section (50) and has a tapered protrusion
3 (614). The tapered protrusion (614) is coaxially formed relative to the inside
4 section (50) and has a top end (not shown). The threaded shaft (612) is coaxially
5 mounted at the top end of the tapered protrusion (614). The locking rotor (613) is
6 rotatably mounted on the threaded shaft (612) and has multiple spacer slots
7 (615).

8 The inside section (50) can be pulled out of or retracted into the outside
9 section (60) to change the length of the hiking stick. The locking mechanism (61)
10 is used to lock the inside section (50) in position relative to the outside section
11 (60) when the hiking stick is adjusted to a given length. The inside section (50)
12 can be turned relative to the outside section (60) to rotate the locking rotor (613)
13 to lock the locking mechanism (61). The rotated locking rotor (613) moves
14 toward the inside end of the inside section (50) along the threaded shaft (612) so
15 that the tapered protrusion (614) jams into the locking rotor (613). The spacer
16 slots (615) permit the jammed locking rotor (613) to engage the interior surface
17 of the outside section (60) and lock the two sections (50, 60) in position.

18 To adjust the locking inside section (50) relative to the outside section
19 (60), the inside section (50) is turned relative to the outside section (60) to rotate
20 the locking rotor (613). The locking rotor (613) moves upward along the
21 threaded shaft (612) to disengage the interior surface of the outside section (60)
22 so that the inside section (50) is adjustable.

23 However, the inside section (50) is easily pulled entirely out of the
24 outside section (60) when adjusting the length of the hiking stick. The inside end

1 of the inside section (50) must be reinserted into the outside section (60) if the
2 inside section (50) is inadvertently pulled out. Therefore, the conventional
3 adjustable hiking stick is inconvenient to use.

4 If the inside section (50) is pulled entirely out of the outside section (60),
5 the locking mechanism (61) will be easy to access. Because the locking rotor
6 (613) is generally made of plastic, the locking rotor (613) is easily inadvertently
7 broken by children or improper operation. If the locking rotor (613) is damaged,
8 the hiking stick is unusable.

9 To overcome the shortcomings, the present invention provides a slide
10 limit device for adjacent sections of an adjustable hiking stick to prevent one
11 section from being completely pulled out of another section to mitigate or
12 obviate the aforementioned problems.

13 SUMMARY OF THE INVENTION

14 The main objective of the invention is to provide an adjustable hiking
15 stick with multiple sections and a slide limit device for each pair of adjacent
16 sections to prevent one section from being pulled completely out of another
17 section so that the hiking stick is convenient to use.

18 To achieve the aforesaid objective, an adjustable hiking stick includes a
19 telescopic tube having multiple interconnected sections. Adjacent sections
20 connect at a joint, and the joint includes an inside section, an outside section, an
21 end sleeve and a slide limit device. The outside section has an outside end. The
22 inside section is slidably mounted in the outside section and has an inside end
23 and an exterior surface. The end sleeve is attached to the outside end of the
24 outside section and has an annular lip. The slide limit device can be ribs, rings or

1 the like that are formed adjacent to the inside end of the inside section and may
2 protrude from the exterior surface of the inside section. The slide limit device
3 will engage the annular lip to keep the inside section from being pulled
4 completely out of the outside section when the inside section is adjusted.

5 Other objectives, advantages and novel features of the invention will
6 become more apparent from the following detailed description when taken in
7 conjunction with the accompanying drawings.

8 **BRIEF DESCRIPTION OF THE DRAWINGS**

9 Fig. 1 is a perspective view of a first embodiment of a slide limit device
10 of an adjustable hiking stick in accordance with the present invention;

11 Fig. 2 is an operational side plan view in partial section of a joint
12 between adjacent sections of the hiking stick in Fig. 1;

13 Fig. 3 is a perspective view of a second embodiment of a slide limit
14 device in an adjustable hiking stick in accordance with the present invention;

15 Fig. 4 is an operational side plan view of a third embodiment of an slide
16 limit device in an adjustable hiking stick in accordance with the present
17 invention; and

18 Fig. 5 is an operational side plan view in partial section of a joint
19 between adjacent sections of a conventional adjustable hiking stick in
20 accordance with the prior art.

21 **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

22 With reference to Figs. 1 and 2, an adjustable hiking stick in accordance
23 with the present invention comprises a telescopic stick (not numbered), a grip
24 (12) and a tip (13). The telescopic stick has multiple interconnected sections, a

1 top end (not numbered) and a bottom end (not numbered). The grip (12) and the
2 tip (13) are attached respectively to the top end and the bottom end of the
3 telescopic tube.

4 The telescopic stick generally has two or three sections. For convenience
5 and illustrative purposes only, a single joint between adjacent sections of the
6 preferred embodiment of the telescopic stick is described, which may include
7 two or more sections. The sections connect sequentially to and slide into one
8 another. Each of the sections may be made of an aluminum tube. Adjacent
9 sections are connected at a joint that comprises a large outside section (10), a
10 smaller inside section (21), a locking mechanism (61), an end sleeve (11) and a
11 slide limit device (not numbered).

12 The outside section (10) has an outside end (not numbered) and an
13 interior surface (not numbered). The inside section (20) is slidably mounted in
14 the outside section (10) and has an inside end (not numbered) and an exterior
15 surface (not numbered). The end sleeve (11) is attached around the outside end
16 of the outside section (10) and has a stop, such as an annular lip (111). The lip
17 (111) protrudes inward relative to the interior surface of the outside section (10).

18 The locking mechanism (61) is mounted at the inside end of the inside
19 section (20) and comprises a stationary end plug (611). The stationary end plug
20 (611) is connected to the inside end of the inside section (20) and has a disk (not
21 numbered) with an edge (not numbered). The disk abuts the inside end of the
22 inside section (20) and the edge is flush with the exterior surface of the inside
23 section (20).

24 The slide limit device is formed adjacent to the inside end of the inside

1 section (20) to abut the lip (111) to keep the inside section (20) from being pulled
2 completely out of the outside section (10) and can be implemented with four ribs
3 (211). The ribs (211) are formed on and protrudes from the exterior surface of the
4 inside section (20) adjacent to the inside end and are arranged annularly.

5 Therefore, when the inside section (20) is pulled out of the outside section (10),
6 the ribs (211) will abut the lip (111) of the end sleeve (11) and keep the inside
7 section (20) from being pulled out completely of the outside section (10).

8 With reference to Fig. 3, a second embodiment of the slide limit device is
9 implemented with a protruding ring (212). The protruding ring (212) is formed
10 on and protrudes from the exterior surface of the inside section (20) adjacent to
11 the inside end. Therefore, when the inside section (20) is pulled out of the outside
12 section (10), the protruding ring (212) will abut the lip (111) of the end sleeve (11)
13 to keep the inside section (20) from being pulled completely out of the outside
14 section (10).

15 With reference to Fig. 4, a third embodiment of the slide limit device is
16 implemented with an extension ring (213) formed on and extending from the
17 edge of the disk of the stationary end plug (611) at the inside end of the inside
18 section (20). Therefore, the extension ring (213) will abut the lip (111) of the end
19 sleeve (11) when the inside section (20) is pulled out of the outside section (10)
20 and keep the inside section (20) from being pulled completely out of the outside
21 section (10).

22 Therefore, the slide limit device may be ribs (211), a protruding ring
23 (212) or an extension ring (213) and will abut the lip (111) of the end sleeve (11)
24 at the outside end of the outside section (10) to prevent the inside section (20)

1 from being pulled completely out as the inside section (20) is adjusted relative to
2 the outside section (10) to lengthen or shorten the hiking stick. The hiking stick
3 in accordance with the present invention is convenient to use and keeps the
4 locking mechanism (61) from being damaged.

5 Even though numerous characteristics and advantages of the present
6 invention have been set forth in the foregoing description, together with details
7 of the structure and function of the invention, the disclosure is illustrative only,
8 and changes may be made in detail, especially in matters of shape, size, and
9 arrangement of parts within the scope of the appended claims.